

REMARKS

Status of the Claims

Claims 1 and 6 are amended. No new matter is added.

Claims 1-7 are pending in the application.

Claim rejection-35 U.S.C. §102

Claim 6 is rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,408,095 to Ariga et al. (“Ariga”). Applicants respectfully traverse.

The disclosed invention is directed to a speaker apparatus for use in an automobile where the speaker apparatus comprises an L channel speaker, an R channel speaker, and a center speaker placed between the L channel speaker and the R channel speaker. The center speaker produces a -L channel signal (a signal having a reverse or opposite phase) and a -R channel signal (a signal having a reverse or opposite phase). The L channel speaker, the R channel speaker and the center speaker are placed in front of the driver seat and passenger seat of an automobile.

The vibration axis of the L channel speaker, in the horizontal direction is counterclockwise from the direction of motion of the automobile and in the vertical direction it intersects with and is oriented to reflect sound from the front glass.

The vibration axis of the R channel speaker, in the horizontal direction is clockwise from the direction of motion of the automobile and in the vertical direction it intersects with and is oriented to reflect sound from the front glass.

The horizontal vibration axis of the center speaker is parallel to the direction of

motion of the automobile and in the vertical direction it intersects with the front glass of the automobile.

Referring to Fig. 5 in the application, L channel speaker radiates left channel sound and R channel speaker radiates right channel sound. And, the center speaker radiates a signal having a reverse phase of the L (left) channel speaker and a reverse phase of the R (right) channel speaker. In the application the reverse phase is designated by a minus sign.

The left channel reverse phase signal (the minus L signal) from the center speaker cancels out more of the L channel signal at the right ear of a person sitting in the left seat of an automobile than at the left ear of that person. Thus, there is a difference in signal levels in the areas near the right and left ear of the person in the left seat of the automobile. As a result, the sound image of the L channel is identified as being near the front left side of the person in the left seat. A similar result is obtained with the person in the right seat of the automobile. The art of record neither discloses nor suggests doing what is disclosed in the application and now positively recited in the claims.

The rejection of claim 6 under 35 U.S.C. §102(b) as being anticipated by Ariga et al., (4,408,095) is traversed. In Ariga, the signals from the left and right channels are mixed in amplifier 9 through resistors R1 and R2 which inverts the phases without deteriorating stereo channel separation. The sound from the center speaker is a low frequency component which is extracted after the left channel signal and the right channel signal are mixed. Referring to Col 2, lines 12- 15, “ ... only the low frequency component providing little sense of direction is taken from the left and right channels so as to allow it to be reproduced from the low frequency loudspeaker, i.e., woofer...”. It is known to those of ordinary skill in the art that it is virtually impossible to determine the source of low frequency sound that comes

from a woofer. The sound from the woofer of Ariga is used to mask the low frequency sound in the automobile. See Col. 2, lines 19-20. Thus, the signal from the center speaker of Ariga is provided to mask engine noise and other noise associated with normal operation of an automobile. The signal from the center speaker of Ariga in not a signal having a reverse phase of the left and right channels signals which is used to cancel out some of the signal to one ear of a person in an automobile as is disclosed in our application. Amended claim 6 avoids the Ariga reference by reciting that the -L channel signal partially cancels the sound to the right ear of a listener on the left side of the speaker apparatus, and the -R channel signal partially cancels the sound to the left ear of a listener on the right side of the speaker apparatus. Applicants respectfully request the rejection be withdrawn.

Claim rejection-35 U.S.C. §103

The rejection of claim 1 under 35 U.S.C. §103(a) as being unpatentable over Yoshida et al., (5,854,847) in view of Carlsson (4,006,311) is traversed. Yoshida discloses an automobile having two side speakers and a central speaker where a delay circuit is coupled to the side speakers so that the sound signals emitted from the side speakers is delayed relative to the sound from the central speaker. In this way the sound from the central speaker is emitted at an earlier time than the sound signals from the side speakers. Referring to Yoshida, col. 4, lines 12-22, "...as a result, for the listeners it seems as if the two side speakers are disposed further away than the central speaker...(and)...for the listeners it seems as if there is only one sound source."(underscoring added). Thus, with Yoshida, the result is that the listener believes that the sound source is coming only from the front of the automobile (see Col. 4, lines 19-22). Yoshida does not disclose speakers having a particular

vertical axis or a particular horizontal axis. Yoshida discloses, in Fig. 2, three speakers mounted in the dash of an automobile. A description as to the orientation of the speakers in the automobile is absent in the description. Carlsson discloses a stereo loudspeaker system intended for home use in a large room having at least one substantially vertical wall.

Claim 1 in the application is amended to avoid the references cited by reciting the structure of an "... L channel speaker and an R channel speaker each having a vertical vibration axis directed at an incline of a prescribed angle in the direction of motion of the automobile to intersect with and direct sound from a front glass of an automobile."

The rejection of claims 2-3 and 5 under 35 U.S.C. §103(a) as being unpatentable over Yoshida et al., (5,854,847) in view of Carlsson (4,006,311) in further view of Ariga et al. (4,408,095) is traversed. Claims 2-3 and 5 depend from independent claim 1. Therefore, claims 2-3 and 5 distinguish over the art cited for at least the same reasons as their base claim.

The rejection of claim 4 under 35 U.S.C. §103(a) as being unpatentable over Yoshida et al., (5,854,847) in view of Carlsson (4,006,311) in further view of Ariga et al. (4,408,095) in further view of Goldfarb (5,764,777) is traversed. Claim 4 depends from claim 2 which depends from independent claim 1. Therefore, claim 4 distinguishes over the art cited for at least the same reasons as the base claim.

Neither Ariga nor Goldfarb, alone or in combination with the other references, teach or suggest the elements noted above and deficient in the other references.

The rejection of claim 6 under 35 U.S.C. §103(a) as being unpatentable over Yoshida et al. (5,854,847) is traversed. Yoshida discloses an automobile having two side speakers and a central speaker where a delay circuit is coupled to the side speakers so that the sound

signals which emit from the side speakers is delayed relative to the sound from the central speaker. In this way the sound from the central speaker is emitted at an earlier time than the sound signals from the side speakers. Referring to Col. 4, lines 12-22, "...as a result, for the listeners it seems [sic] as if the two side speakers are disposed further away than the central speaker...(and)...for the listeners it seems [sic] as if there is only one sound source."(underscoring added). Thus, with Yoshida, the result is that the listener believes that the sound source is coming only from the front of the automobile (see Col. 4, lines 19-22). Yoshida neither discloses nor suggests producing sound from the central speaker that has a reverse phase of the sound from the left speaker to partially cancels the sound to the right ear of a listener on the left side of the speaker apparatus, and a reverse phase of the sound from the right speaker to partially cancels the sound to the left ear of a listener on the right side of the speaker apparatus. Amended claim 6 clearly avoids Yoshida by reciting that the -L channel signal (the left channel reverse phase signal) partially cancels the sound to the right ear of a listener on the left side of the speaker apparatus, and the -R channel signal (the right channel reverse phase signal) partially cancels the sound to the left ear of a listener on the right side of the speaker apparatus.

The rejection of claim 7 under 35 U.S.C. §103(a) as being unpatentable over Yoshida et al. (5,854,847) in view of Carlsson (4,006,311) is traversed. Yoshida does not disclose speakers having a particular vertical axis or a particular horizontal axis. All Yoshida teaches, in Fig. 2, are three speakers mounted in the dash of an automobile. Yoshida provides no description about the orientation of the speakers in the automobile. Carlsson discloses a stereo loudspeaker system intended for home use in a large room having at least one substantially vertical wall. Claim 7 in the application depends from claim 6 and, therefore,

avoids the references cited by reciting that the -L channel signal (the left channel reverse phase signal) partially cancels the sound to the right ear of a listener on the left side of the speaker apparatus, and the -R channel signal (the right channel reverse phase signal) partially cancels the sound to the left ear of a listener on the right side of the speaker apparatus, in combination with the structure of an L channel speaker and an R channel speaker each being pivoted and inclined as defined. In addition, claim 7 depends from independent claim 6. Therefore, claim 7 distinguishes over the art cited for at least the same reasons as the base claim.

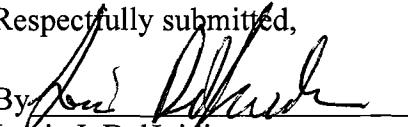
CONCLUSION

Each and every point raised in the Office Action dated September 19, 2007 has been addressed on the basis of the above amendments and remarks. In view of the above, each of the presently pending claims in this application is believed to be in condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

The Examiner is respectfully requested to contact the undersigned at the telephone number indicated below if the Examiner believes any issue can be resolved through either a Supplemental Response or an Examiner's Amendment.

Dated: December 10, 2007

Respectfully submitted,

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